CLAIMS

1. A method for sonoporation for intradermal delivery of a microparticles suspension containing a beneficial substance to be released into an area of a patient's skin comprising: (a) providing a container having a first end and a second end, said second end having thereon a ring of skin-removable resilient medical adhesive material and being covered by a removable protective film; (b) submerging the tip of an ultrasound horn in said microparticles suspension through said first end of the container; (d) removing the protective film; and (d) placing said second end in contact with an area of a patient's skin intended to receive said beneficial substance and (e) applying ultrasound radiation to said microparticles suspension at a frequency, an intensity, for a period of time, and at a distance from the skin, effective to generate cavitation bubbles, wherein said cavitation bubbles collapse and transfer their energy into the skin area thus causing the formation of pores in the skin area; and wherein said ultrasound radiation intensity and distance from the skin area are also effective in generating ultrasonic jets, said ultrasonic jets driving said microparticles through said formed pores into the skin area with a majority of the microparticles remaining intact.

2. The method of claim 1 wherein substantially all of said microparticles remain intact upon being driven into the skin area.

3. The method of claim 1, wherein said second end has a microporous membrane thereover.

4. The method of claim 1, wherein the average diameter of the microparticles is from 0.1 micron to 50 microns.

5. The method of claim 4, wherein the average diameter of the microparticles is from 1 micron to 5 microns.

6. The method of claim 1, wherein the frequency of said ultrasound radiation is from 1kHz to 30 kHz.

7. The method of claim 6, wherein the frequency of said ultrasound radiation is about 20 kHz.

8. The method of claim 1, wherein the microparticles are liposomes, biodegradable spherical particles made of polymeric shell with a drug inside, or polymeric spheres with the drug attached to the surface of the microparticles.

9. The method of claim 1, wherein the container has therewithin a capsule containing a predetermined quantity of microparticles suspension, further comprising the step of releasing said microparticles suspension from said capsule after the aforesaid step (d).

10. The method of claim 1, wherein said container is removed from the ultrasound horn and disposed of after a single use.

11. The method of claim 1, wherein said container comprises: (1) an outer wall; (2) an inner wall; and (3) an absorbent wick placed between said inner and outer wall, said wick absorbing any excess microparticles suspension; and wherein said ring of medical adhesive is on the end of the inner wall, said adhesive ring being constructed to prevent microparticles suspension from leaking out during ultrasonic application.

12. The method of claim 11, wherein said medical adhesive is a silicone, rubber or acrylic.

13. The method of claim 11, wherein said container further comprises an inlet septum for filling said container with the microparticles suspension.
14. The method of claim 11, wherein said container further comprises a hollow ring extending thereabout, said hollow ring containing microparticles suspension, and further comprising the step of introducing into microparticles suspension into said container from said hollow ring after the aforesaid step (3).

15. The method of claim 1 wherein said tip comprises a flat distal end surface.

16. The method of claim 1 wherein said tip comprises a concave distal end surface.

17. The method of claim 1 wherein said tip comprises a flat distal end surface having a plurality of depressions.

18. The method of claim 1, wherein said tip comprises a body having a marking indicating a level of the microparticles suspension to be contained in the container.

19. A method for sonoporation for intradermal delivery of a microparticles suspension containing a beneficial substance to be released into an area of a patient's skin comprising: (a) providing a container having a first end and a second end, said second end being covered by a porous membrane removably covered by a protective film; (b) submerging the tip of an ultrasound horn in said microparticles suspension through said first end of the container; (d) placing said second end in contact with an area of a patient's skin intended to receive said beneficial substance and (d) applying ultrasound radiation to said microparticles suspension at a

frequency, an intensity, for a period of time, and at a distance from the skin, effective to generate cavitation bubbles, wherein said cavitation bubbles collapse and transfer their energy into the skin area thus causing the formation of pores in the skin area; and wherein said ultrasound radiation intensity and distance from the skin area are also effective in generating ultrasonic jets, said ultrasonic jets driving said microparticles through said formed pores into the skin area with a majority of the microparticles remaining intact.

20. The method of claim 19, wherein substantially all of said microparticles remain intact upon being driven into the skin area.

21. The method of claim 19, wherein the average diameter of the microparticles is from 0.1 micron to 50 microns.

22. The method of claim 21, wherein the average diameter of the microparticles is from 1 micron to 5 microns.

23. The method of claim 19, wherein the frequency of said ultrasound radiation is from 1kHz to 30 kHz.

24. The method of claim 23, wherein the frequency of said ultrasound radiation is about 20 kHz.

25. The method of claim 19, wherein said second end has thereon a ring of skin-removable resilient medical adhesive material which is covered by said removable protective film.